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(CASE REPORT)

Incidental diagnosis of apical hypertrophic cardiomyopathy in an asymptomatic elderly patient: The diagnostic value of routine electrocardiography

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Abstract

Background: Apical hypertrophic cardiomyopathy (ApHCM) is a rare variant of hypertrophic cardiomyopathy characterized by myocardial hypertrophy confined to the left ventricular apex. It typically presents in adulthood with symptoms or characteristic electrocardiographic abnormalities. Incidental diagnosis in asymptomatic elderly patients remains uncommon and raises important questions regarding optimal management.

Case Summary: We report the case of a 75-year-old woman with type 2 diabetes and no prior cardiovascular history or family history of cardiomyopathy, who underwent a routine electrocardiogram as part of her systematic diabetic follow-up. The ECG revealed deep giant negative T-waves in the anterior and lateral precordial leads. Transthoracic echocardiography demonstrated apical left ventricular hypertrophy with a characteristic "spade-like" cavity appearance, preserved systolic function, and no intraventricular obstruction, confirming the diagnosis of ApHCM. Given her asymptomatic status, no further investigations were pursued.

Conclusion: This case highlights the diagnostic value of routine ECG in unveiling silent ApHCM, even in elderly patients. It also underscores the need for tailored follow-up strategies in asymptomatic older individuals with this condition.

Keywords: Apical hypertrophic cardiomyopathy; Elderly patient; Electrocardiography; Asymptomatic; Incidental finding

1. Introduction

Hypertrophic cardiomyopathy (HCM) is the most common inherited cardiac disorder, with an estimated prevalence of 1 in 500 in the general population. It encompasses a heterogeneous group of phenotypes, among which apical hypertrophic cardiomyopathy (ApHCM) represents a distinct and relatively rare variant, first described by Yamaguchi et al. in 1979 in a Japanese cohort. ApHCM is characterized by myocardial hypertrophy predominantly or exclusively involving the left ventricular apex, resulting in the pathognomonic "spade-like" or "ace of spades" cavity configuration on imaging. (1–3)

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The condition has historically been considered more prevalent in Asian populations, where it may account for up to 25% of HCM cases, compared to approximately 1–2% in Western series. Clinically, ApHCM follows a generally benign course, though it carries a non-negligible risk of atrial fibrillation, apical aneurysm formation, and, rarely, sudden cardiac death. (2,4,5)

The electrocardiogram plays a pivotal role in raising the initial suspicion, typically showing giant negative T-waves (amplitude ≥ 10 mm) in the precordial leads, a finding that, in the appropriate clinical context, should prompt echocardiographic evaluation. However, because these ECG changes may be discovered incidentally in entirely asymptomatic individuals, diagnosis is sometimes considerably delayed. (2)

We report the case of a 75-year-old asymptomatic woman in whom ApHCM was incidentally diagnosed following a routine ECG performed as part of her diabetic follow-up, and discuss the diagnostic approach and management considerations in this particular setting.

2. Case Presentation

A 75-year-old woman with a known history of type 2 diabetes mellitus and no prior cardiovascular history, no family history of cardiomyopathy or sudden cardiac death, and no cardiac symptoms was referred for a routine electrocardiogram as part of her systematic diabetic follow-up. She denied any exertional dyspnea, chest pain, palpitations, or syncope.

The resting 12-lead electrocardiogram revealed sinus rhythm at 88 beats per minute, striking deep giant negative T-waves in the anterior and lateral precordial leads (V3–V6), with T-wave inversions also noted in the inferior leads (II, aVF), and isolated ventricular extrasystoles. No pathological Q-waves, atrial fibrillation, or bundle branch block were identified (Figure 1).

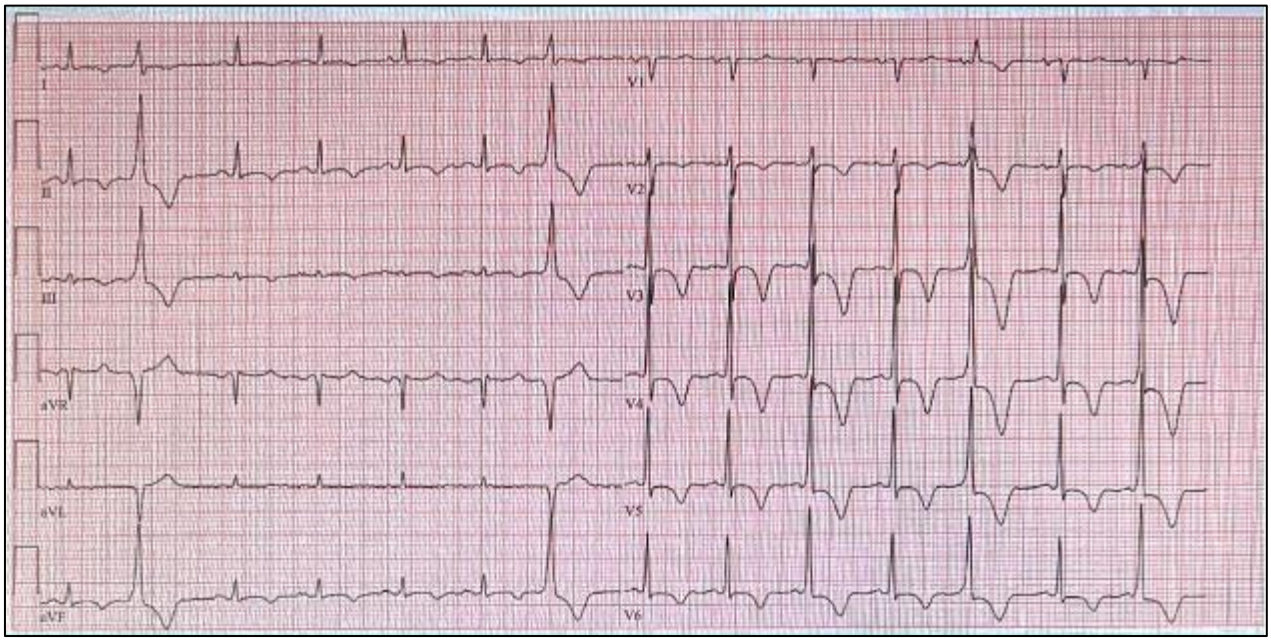

Figure 1 Twelve-lead electrocardiogram showing sinus rhythm with deep giant negative T-waves in leads V3–V6 and inferior leads (II, aVF), and isolated ventricular extrasystoles, highly suggestive of apical hypertrophic cardiomyopathy

Given the characteristic electrocardiographic pattern, transthoracic echocardiography (TTE) was promptly performed. It demonstrated marked myocardial hypertrophy confined to the left ventricular apex, resulting in the pathognomonic "spade-like" or "ace of spades" configuration of the left ventricular cavity in the apical four-chamber view. Left ventricular systolic function was preserved, with no resting or provoked intraventricular obstruction, no significant mitral regurgitation, and no other structural abnormalities (Figure 2).

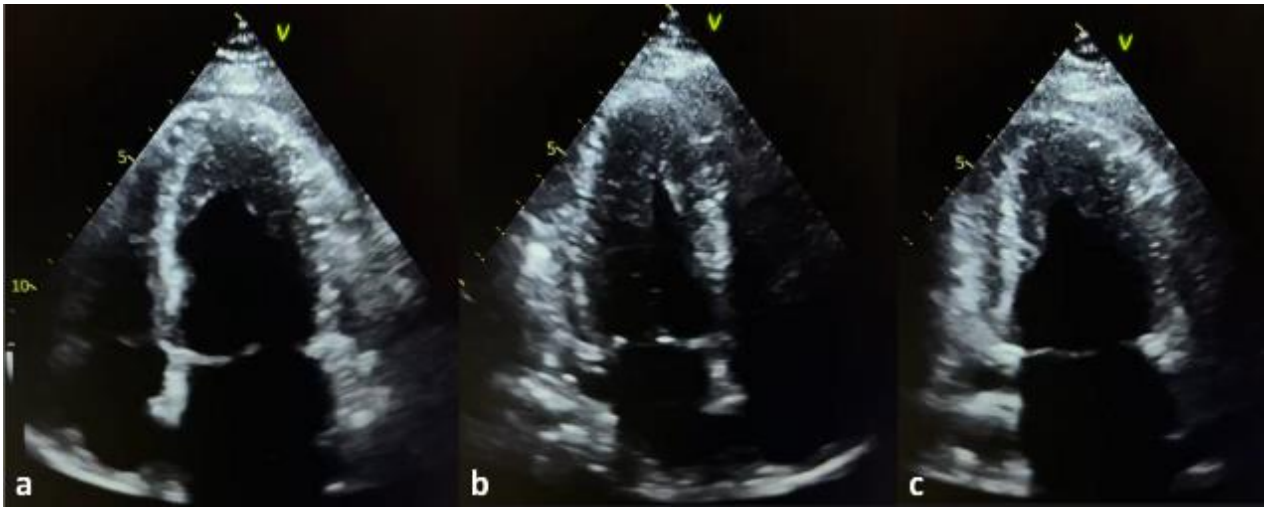

Figure 2 Transthoracic echocardiography in apical views demonstrating marked myocardial hypertrophy confined to the left ventricular apex with the characteristic "spade-like" cavity configuration. (a) Apical four-chamber view; (b) Apical three-chamber view; (c) Apical two-chamber view

The combination of the electrocardiographic findings and the echocardiographic morphology was consistent with a diagnosis of apical hypertrophic cardiomyopathy (ApHCM). Further investigations — including cardiac magnetic resonance imaging, ambulatory ECG monitoring, and genetic testing — were not pursued, in accordance with the patient's own wishes, given her advanced age and fully asymptomatic status. A beta-blocker was initiated for management of the ventricular extrasystoles. The patient was educated about her condition, and regular clinical and echocardiographic follow-up was planned.

3. Discussion

Apical hypertrophic cardiomyopathy is a morphological variant of HCM first described by Yamaguchi et al. in 1979, characterized by hypertrophy restricted to the left ventricular apex. (2) While initially reported predominantly in Japanese populations, where it accounts for up to 25% of HCM cases, ApHCM is increasingly recognized in non-Asian populations, though it remains rare, representing approximately 1–2% of HCM cases in Western series. (4)

The clinical course of ApHCM is generally considered more benign than other HCM variants, given the absence of left ventricular outflow tract obstruction. However, it is not without risk. Major complications include atrial fibrillation, which occurs in up to 20–30% of patients, apical aneurysm formation — a substrate for thromboembolic events and ventricular arrhythmias — and, less frequently, sudden cardiac death. (5) In our patient, no atrial fibrillation was detected on the presenting ECG or during clinical evaluation, which is consistent with the relatively favorable profile observed at diagnosis in asymptomatic cases. (5)

The electrocardiogram remains the cornerstone of initial suspicion in ApHCM. The hallmark finding — giant negative T-waves with an amplitude of ≥10 mm in the precordial leads — was first described by Yamaguchi et al. as part of the original phenotypic characterization of the disease. (2) These changes, when encountered in a routine or screening context, should systematically prompt echocardiographic evaluation. In our case, it was precisely this incidental ECG finding during a diabetic screening that led to diagnosis, underscoring the diagnostic value of a simple, widely available tool.

Transthoracic echocardiography confirmed the diagnosis by demonstrating the characteristic apical hypertrophy and "spade-like" cavity morphology. (3) While cardiac magnetic resonance imaging (CMRI) is considered the gold standard for phenotypic characterization — offering superior tissue characterization, accurate wall thickness quantification, and detection of late gadolinium enhancement as a fibrosis marker — it was not pursued in this case. (6) The patient, being elderly and fully asymptomatic, declined further investigations, a decision that was respected given the benign presentation and the absence of high-risk features.

The management of asymptomatic ApHCM in elderly patients represents a particularly nuanced challenge. Current ESC and ACC/AHA guidelines on HCM recommend risk stratification for sudden cardiac death, ambulatory rhythm monitoring for arrhythmia detection, and consideration of genetic counseling. (7,8) However, these recommendations

are largely derived from younger cohorts, and their applicability to elderly asymptomatic patients — in whom the benefit-to-risk ratio of invasive investigations or implantable defibrillators may differ substantially — remains a matter of clinical judgment. In our patient, the identification of ventricular extrasystoles prompted the introduction of a beta-blocker, which represents a reasonable and guideline-consistent first-line approach for symptomatic arrhythmia management in HCM. (7) Particular vigilance for the development of apical aneurysm was also noted, given its association with thromboembolic risk and ventricular arrhythmias. (9)

This case adds to the growing body of literature highlighting that ApHCM can remain clinically silent for decades, with diagnosis delayed well into the seventh or eighth decade of life. It reinforces the argument for maintaining a low threshold for echocardiographic evaluation when characteristic ECG abnormalities are encountered, regardless of the patient's age or symptom status.

4. Conclusion

Apical hypertrophic cardiomyopathy is a rare but clinically significant condition that can remain entirely silent for decades, with diagnosis occasionally delayed until late in life. This case illustrates how a routine electrocardiogram, performed in the context of diabetic screening, can unmask an otherwise unsuspected structural cardiac disease. The characteristic pattern of giant negative T-waves in the precordial leads should always prompt echocardiographic evaluation, irrespective of the patient's age or symptom status. Furthermore, this observation raises important questions regarding the optimal management strategy in elderly asymptomatic patients, where guidelines derived from younger populations may not be directly applicable, and where patient preferences must be central to clinical decision-making. Regular follow-up with clinical assessment and echocardiographic monitoring remains warranted, with particular vigilance for the development of atrial fibrillation, apical aneurysm, or symptomatic arrhythmias.

Compliance with ethical standards

Acknowledgments

The authors would like to thank the patient for her consent to publish this case report.

Disclosure of conflict of interest

The authors declare no competing interest.

Statement of ethical approval

Ethical approval for this case report was obtained from the Ethics Committee of the Mohamed V Military Teaching Hospital, Mohamed V University, Rabat, Morocco. The committee does not issue reference numbers.

Statement of informed consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

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